

APPENDIX-continued

APPENDIX-continued

```

KP.2;
KI.15;
KD.0;
HPB=0;
RFB=0;
XYHomed=0;
IdleTM=0;
ITime=0;
JS #INITGL
JS #INITWL
EN;
rem End #INI *****
rem *** Inertia Friction Welding Inc.
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rem
#WELD1
HX:
RFB=0;
MG "Weld Cycle Started"
ER=WeldFE;
OE=1;
rem
TL WeldTL;
GN WeldGN;
SP WeldSP;
AC WeldAC;
DC WeldDC;
KP WeldKP;
KI WeldKI;
KD WeldKD;
Dist=PPR*WeldRev;
DistC=Dist-(PPR*TrigRev);
PR Dist;
TW 500;
BGN;
MG "Scrub ..."
rem: Scrub start
AT 0;
AT ScrubTM;
rem: Burn start
CB1;
MG "Burn ..."
AD Dist2;
rem: WTSN)
rem: Forge Start
CB 2;
SB 1;
MG "Forge ..."
AMX;
KP WeldKP2;
WT ForgeTM;
SS 2
MG "Weld complete"
WT 10000
KP WeldKP;
EN;
rem: End #WELD: *****
rem:
#CYCLE
JS #HOME.XYHomed=;
JS #WELD1;
XO #IDLE;
EN;
rem: End #CYCLE *****
#MCTIME
MG "Position timecut ..."
RE
rem: End WELD.CYCLE MODULE *****
rem:
#INITGL
rem:
rem: GLOBAL VARIABLES
rem:
rem:
rem: PULSES PER INCH
PPi=1000.000000;
rem: PULSES PER REV
PPR=7541.22449

```

```

rem: Timer Ticks Per Second
TPS=1000
rem: Input Volts Per Unit
IVLPPKM=2.000000
IVLPPSI=3.000000
rem: Output Volts Per Unit
OVLPKPM=2.000000
OVLPSSI=3.000000
rem: Sample Rate
SampleRt=100
rem: Number of IO
rem: Naming following error counts
HomeFE=2000;
HomeVel=1000;
HomeAcc=500;
HomeDec=500;
HomeP=.8;
HomeI=.02;
HomeD=.2;
GHomeVel=1000;
FTVel=1000;
rem: Software limits
XFLimit=11.000
YFLimit=11.000
XBLimit=-0.100
YBLimit=-0.100
InvertIO=1
rem: Max Move Values
MaxXMVel=10
MaxXMAcc=40
MaxXMDec=40
EN
rem
rem: Weld start values
#INITWL
rem: *** Inertia Friction Welding Inc.
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rem
rem: Weld specific params
WeldRPM=1750
ScrubTM=2000;
ForgeTM=4000;
WeldRevS=10
Degrees=0
TrigRev=0.5
rem:
rem: PID params
WeldAcc=100
WeldDec=100
WeldKP=0.5
WeldKP2=.1
WeldKI=0.02
WeldKT=.50
WeldFE=1.5
WeldTL=9.9988
WeldGN=20
rem:
rem: Calculated parameters
WeldRev=(Degrees/360)*WeldRevS;
WeldSP=(WeldRPM*PPR)/60;
WeldAC=(WeldAcc*PPR)/60;
WeldDC=(WeldDec*PPR)/60;
WeldFE=WeldFE*PPR;
rem
rem: End weld.txt *****
EN
rem: End #INITWL *****

```

APPENDIX

```

rem *** Inertia Friction Welding Inc
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rem:
rem:
rem: *** Inertia Friction Welding Inc
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rem:
rem: *** #MAIN
rem: This is the main program task
#MAIN
JS #INIT
XQ #IDLE.1
#MAIN1
JS #CYCLE.@IN[1]=0;
JS #HOME.HPB=1;
JS #WFL.D1.RPR=1;
JP #MAIN1
EN
rem: End #MAIN*****
rem: *** Inertia Friction Welding Inc
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rem:
rem: *** #HOME
rem: Home function
#HOME
HN 1;
HPB=0;
MG "HOME"
XYHomed=0;
HomeIP=1;
Kevf.Nmfr.Kmfr.Nmfr;
ER HomeFE;
AC HomeAcc;
DC HomeDev;
KP HomeF;
KI HomeI;
KD HomeD;
IL 2.VT 1;
#HOMEX
MG "Homing ... "

```

APPENDIX-continued

```

StatMsg="HOMEX"
rem: Make sure of home switch
MG "Get of 'home switch ... "
JU HIVEBUGX;
#WFX2JP #WFXC.@IN[2]=0;
WT 500
STX.AMDLJP #HOMEX.@IN[1]=0;
MG "Off Home switch ... "
rem: Find home LS
MG "Looking for home switch ... "
#WFX1;
PR -4;Mfr.AMX;
JP #WFX1.@IN[2]=1:XPos= TPX;
MG "Home switch found ... "
rem:
rem: Go back to home position
SP FTVel;
PA XPos:BG:AM:DP0;
MG "Slides Homed ... "
#HOME1
XYHomed=1;
XQ #IDLE.1;
EN
rem: End #HOME*****
rem: *** Inertia Friction Welding Inc
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rem:
rem: *** #POSERR
rem: Position following error
#POSERR
ZS;
JS #HALT;
MG "FOLLOWING ERROR"
StatMsg="FOLERR"
ZSJp #MAIN;
RF
rem: End #POSERR *****
rem: *** Inertia Friction Welding Inc
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rem:
rem: *** #HALT
rem: Brings motion to a stop
#HALT
StatMsg="HALT"
ER*=10002:II 0:AB 1:WT 1000;
SH.CS.HN 1:MO;
OP255;
rem: JS #CLEARIO;
MG "Servo program halted ... "
EN
rem: end #HALT *****
rem: *** Inertia Friction Welding Inc
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rem:
rem: #IDLE
IdleTM=TIME
#IDLE1
JP #IDLE.1.TIME-IdleTM(0);
ITime=ITime+1;
MG "Servo Ready ... ",ITime(Fo)
JP #IDLE;
EN
rem: End #IDLE *****
rem: *** Inertia Friction Welding Inc
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rem:
rem: #INIT
SB 1:SB 2:SB 3:SB 4;
SB 5:SB 6:SB 7:SB 8;
ER*=:COO;
OE*=1;
TL 1;
GN 1;
AC 500;
DC 500;

```